Narrow strip rotary hoe cultivator for small tractor with low horsepower, DIY

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https://sites.google.com/view/low-tech-farm-tools

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Rotary hoe cultivators are used to uproot weeds at the white root stage before they emerge; loosen surface soil; and break soil capillary water flow to desiccate young shallow rooted weeds. The rotary hoe is pulled at 5 to15 miles per hour (8 to 24 km/h) and cultivates the width of the implement, 8 to 40 feet (2.4 to 12 m) without regards to crop rows. A narrow version cultivates individual beds without hoeing the tractor wheel row; is lighter in weight; requires less tractor horsepower; and used in conjunction with sweeps and chisels to cultivate and hoe in a single pass. When using the narrow strip rotary hoe in conjunction with sweeps and chisel, the tractor ground speed is 2 to 3 miles per hour (3.2 to 4.8 km/h). Dry weather following cultivation with a rotary hoe increases effectiveness of weed control. It is used from 1 week after crop emergence until 4–6-inch crop height.

Here is a design for a 2 feet wide strip rotary hoe cultivator to hoe a bed with 2 rows of beans spaced 11 inches apart. It was pulled by a small 15.7 drawbar horsepower tractor. Design can be altered for different bed width.

Cultivating with three 2-feet wide strip rotary hoes using a John Deere model 750 tractor with 15.7 drawbar horsepower, 18.5 PTO horsepower and 889-pound lift capacity at 24

inch behind lift point. Cultivation in this picture was 1 week after bean emergence, to remove spring weeds such as wild radish and smartweed.

Single pass cultivation with mini disk, chisel and sweep in the lead position, followed by rotary hoe. Tool bar was lifted up to show the implements.

Materials for a 2 feet wide strip rotary hoe:

6 Rotary hoe wheels, 21-inch diameter from www.ShoupParts.com, order number SH21 or from www.sloanex.com

Shaft for 6 rotary hoe wheels: 5/8-inch diameter x 24-inch length (1.59 x 61 cm)

Welded frame made from 1 x 2-inch steel tube with 0.120 wall (2.5 x 5 x 0.3 cm):
- 2 pieces cut to 16 ½ inches (42 cm) for sides
- 1 piece cut to 21 inches (53 cm) for top
- 1 piece cut to 13 inches (33 cm) for middle shaft support

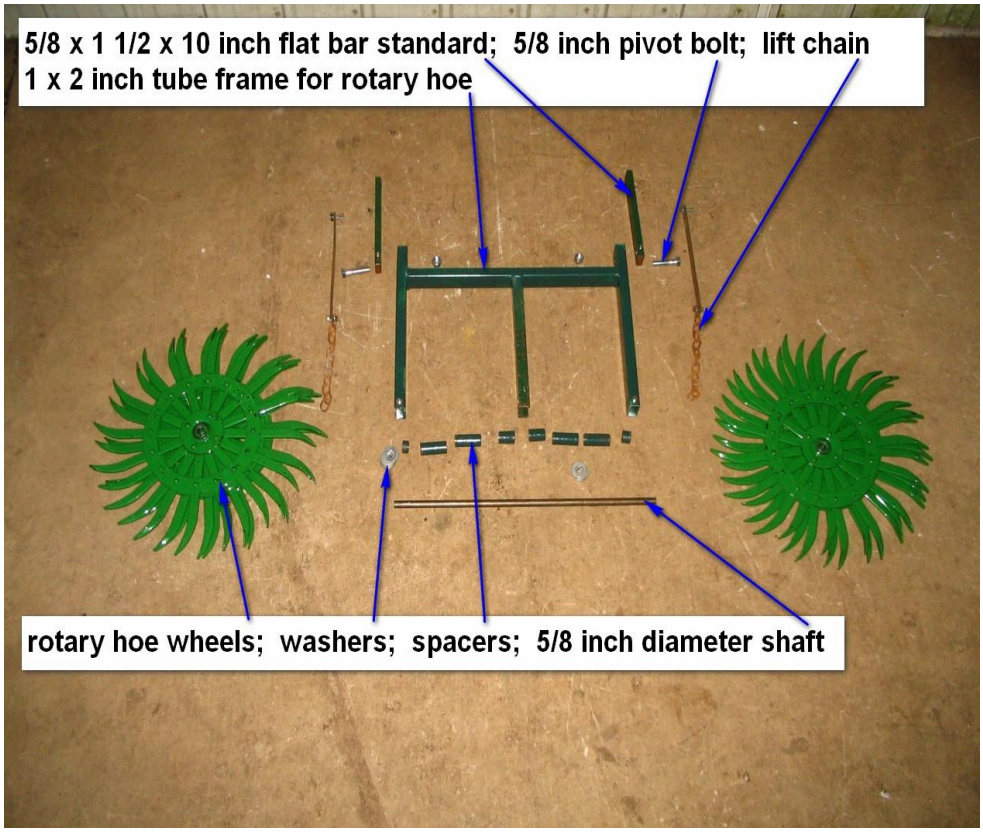
Spacers made from ¾ x 2 ½ inch (1.9 cm x 6.3 cm) pipe inserted in shaft to separate rotary hoe spokes 3 ½ inch (8.9 cm) apart

Steel washers: 5/8-inch diameter inserted in shaft, between spacer and wheels

Standards for attaching welded frame to tool bar: 2 pieces of 5/8 x 1 ½ x 10 inches flat steel bar (1.59 x 3.8 x 25 cm)

Pivot bolts (2) 5/8-inch diameter x 2 1/2 inch (1.9 x 6.3 cm) attaches standards to welded frame

Lift chain: 21 inches (53 cm) made from 3/16 x ½ x 12 inch (0.48 x 1.3 x 30 cm) flat bar and 9 inches (23 cm) of chain to lift and carry the rotary hoe on tool bar when not engaged on soil surface.


5/8 x 1 1/2 x 10 inch flat bar standard; 5/8 inch pivot bolt; lift chain
1 x 2 inch tube frame for rotary hoe
rotary hoe wheels; washers; spacers; 5/8 inch diameter shaft

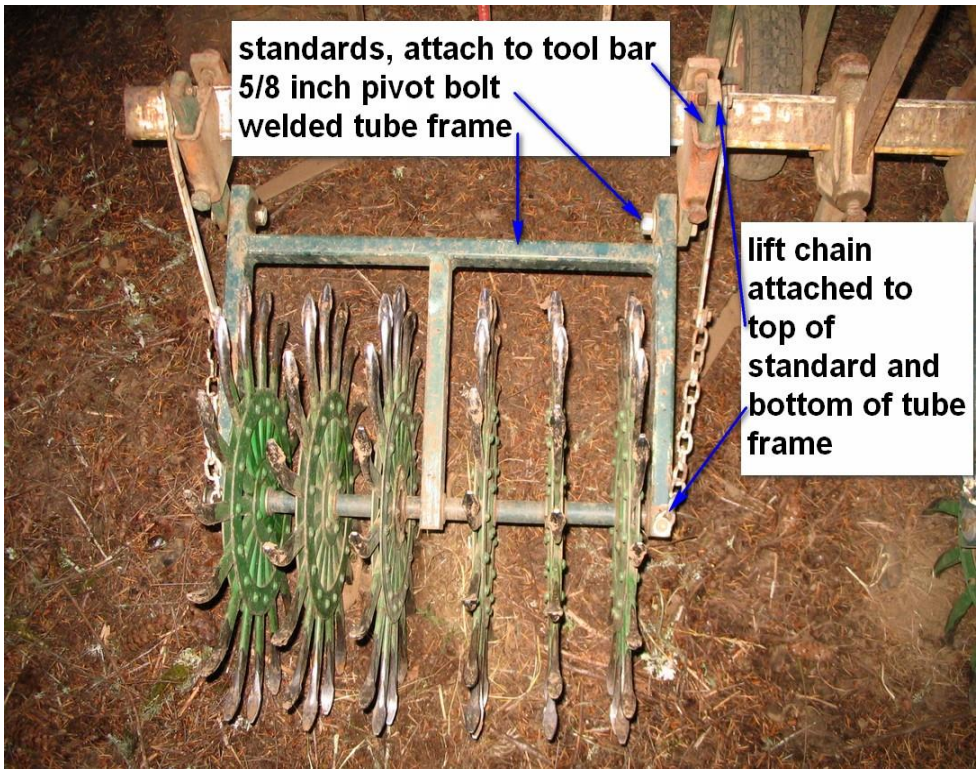
Parts for making a 2 feet wide strip rotary hoe: 6 rotary hoe wheels; shaft; welded frame; spacer to separate spokes 3 ½ inches apart; standards for attaching the strip rotary hoe to tool bar; lift chain to carry the rotary hoe.

Construction

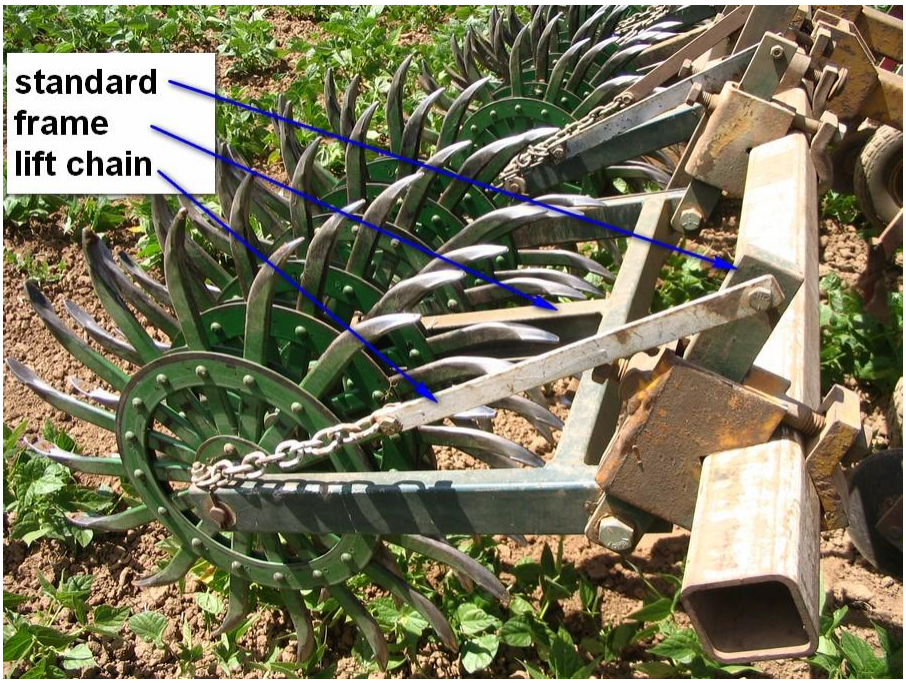
1. Shaft (5/8-inch diameter x 24 inch): drill 3/16-inch holes on each end for cotter pin to lock the shaft in the frame.
2. Frame
   a. Sides (1 x 2 x 16 inch, 0.120 wall steel tube): drill two 5/8-inch diameter holes, centered 1inch from each end; one hole for 5/8-inch pivot bolt and one hole for 5/8-inch shaft
   b. Middle support (1 x 2 x 13 inch, 0.120 wall steel tube or 1 x 2 x 13-inch channel): drill 5/8-inch diameter hole centered 1inch from the end for 5/8-inch diameter shaft
   c. Top (1 x 2 x 21 inches) to be welded on to sides and middle shaft support
   d. Welding: insert 5/8-inch shaft into the 5/8 inch hole on side followed by middle support and side. Place the top between the two sides and snug against the middle support. The space between the top tube and shaft should allow free rotation of the 6 rotary hoe wheels on the shaft. Tack-weld the sides and middle

support to top. Remove shaft then do final welding of sides, middle support and top.

3. Spacers: cut four ¾ inch diameter x 2 ½ inch pipe and two ¾ inch diameter x 1 inch pipe for spacing 6 rotary hoe wheels between the welded frame; two ¾ inch diameter x ~1/2 inch to fill the gap between side of frame and outside wheels.
4. Attach rotary hoe wheels on frame using shaft, spacer and washers. Lock the shaft in place with cotter pins.
5. Standards (5/8 x 1 ½ x 10-inch flat bar): drill a 5/8-inch diameter hole centered 1 inch from bottom end for 5/8-inch pivot bolt; drill a 5/16-inch diameter hole centered ½ inch from top end for lift chain attachment.
6. Make the lift chain using 3/16 x ½ x 12-inch flat bar and 9 inches of chain. The lift chain bolts to top of standard and bottom of frame.
7. Optional: reinforce the 5/8-inch pivot bolt holes on the side frame with a 5/8-inch diameter x ¾ inch tubes. Add grease fitting to standard to lubricate the pivot bolt.


standards, attach to tool bar
5/8 inch pivot bolt
welded tube frame
lift chain attached to top of standard and bottom of tube frame

2 feet wide strip rotary hoe, rear view



Narrow strip cultivator lifted up on tool bar

Cultivating beans at 6-inch plant height with sweeps, chisels and mini disks in the lead followed by narrow strip rotary hoe. The sweeps, chisels and mini disk loosen soil and allow deeper penetration of rotary hoe spokes. The rotary hoe break soil capillary water flow and desiccate young shallow rooted weeds such as late emerging nightshades.